Forest Service

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Subject: 2009 Forest Health Projects on the Mogollon Ranger District

To: District Ranger, Mogollon RD, Coconino NF

I recently met with Shawn Martin, Silviculturist, and Matt Paciorek, Timber Management Assistant, to view select ponderosa pine stands within the East Clear Creek project area and to evaluate several isolated aspen stands on the District. This report includes an assessment of any damaging agents and recommendations to minimize their impacts.

East Clear Creek Dwarf Mistletoe Sanitation TSI

The sites we visited are dominated by ponderosa pine with a minor component of Gambell oak. Some stands are even-aged in structure while others are multi-storied. All stands are overstocked in trees <9" in diameter at breast height (DBH) and have dwarf mistletoe (DM) infestations ranging from light to heavy. The primary objectives of the East Clear Creek project are to reduce forest fuels, increase the diversity of vegetative species and structure, and improve the quality of wildlife habitat. Silvicultural emphasis in ponderosa pine forest types is designed to promote the development of multiple age classes of trees by applying uneven-aged silviculture treatments. The prescription calls for thinning trees <9" dbh to a target spacing of approximately 20' x 20', but will vary to allow for retention of the healthiest and best-formed trees. Generally, trees with good form and dwarf mistletoe infection in less than one-half of its crown will be selected over trees with poor form and DM infection in more than one-half of the live crown.

The prevalence of DM is considered when selecting retention trees. The intensity of DM infection is estimated by assigning dwarf mistletoe ratings (DMR) to each tree using Hawksworth's[i] 6-class system. This rating system divides the live crown of trees into thirds, and each third is rated separately as: 0, no mistletoe infection; 1, less than 50% of live branches infected; 2, more than 50% of live branches infected. The ratings for each third are totaled to obtain a DMR for a tree ranging from 0-6. Typically, less severely infected trees are chosen for retention over the more severely infected trees. This is because dwarf mistletoe infection begins to reduce tree growth when DMR is greater than 3, growth loss increases with the severity of infection[ii], and mortality occurs in DMR 5 & 6 trees. The more severely infected trees are often attacked by bark beetles[iii].

The focus of managing mistletoe is to reduce the impacts of mistletoe infection on forest resources. Mistletoe management is a continuous process: new dwarf mistletoe infections take 3- to 5-years (latent period) to produce visible aerial shoots and not all infection can be detected and removed during one treatment. At least one treatment is recommended 5 to 10 years after an initial treatment, and can be accomplished during regularly scheduled silvicultural or prescribed fire treatments.

Aspen Stands

We visited several aspen sites with high mortality rates and significant browse pressure. Shawn and Matt propose to remove ponderosa pine from these sites to reduce competition for nutrients, water and sunlight and they propose to install, or in many areas replace, protective fencing to limit browse damage. Since elk are literally the biggest browsers, the fencing must be at least 6 and ½ feet tall. Although most of the sites proposed for treatment were initially fenced in the '80s and '90s, the Little Draw Aspen Restoration Project area has had no prior treatment.

Figure 1 Aspen sprout with browse damage.

Aspen stands across the Coconino NF have experienced severe mortality over the last few decades, but particularly the last 10 years due, to a combination of factors including long-term drought, a June frost event, and forest succession[iv] [v]. The succession of aspen to ponderosa pine is believed to have been enhanced by fire suppression practices over the past 100+ years, which allowed the establishment and development of more shade tolerant species. Another compounding factor in the loss of aspen across the Forest is browsing by ungulates over the last century; initially by sheep and cattle but for the past 20 years Rocky Mountain elk populations have reduced the survival of aspen sprouts to only those areas that are protected with tall fencing [vi] or are located on rocky outcrops and steep slopes.

Recommendations

Treatments to mitigate DM impacts can be integrated with other treatment activities like reducing a stands susceptibility to fire or insect outbreaks. Uneven-aged treatments should only be considered in non-dwarf mistletoe infected or lightly infected stands on good quality sites that have well defined infection patches in which group selection can be used to target the removal of infected trees. The 4-acre patch cut size limitation set by the goshawk management guidelines is not an advisable treatment in stands that have greater than 25% infection rates. In some of these stands, thinning, in which non-host trees and the less severely infected trees are retained on the site, can be the best option. The increase in space between trees helps limit spread and competition is reduced. This lessens infection levels while still allowing trees to grow to maturity. In the most severely infected sites, deferral or selection of non-host species is recommended.

Regardless of the emphasis on even-aged or uneven-aged stands, proper selection and marking of leave trees is paramount to the success of treatment. In stands selected for group selection treatments it is important to attempt to remove trees with latent infections, as described above, cutting 30-40 feet beyond the edge of visible infection. In stands receiving individual tree

selection treatments, leave trees should have none to very little mistletoe infection. Monitoring for follow up treatments in 5 to 10 years is recommended.

Thinning slash may pose a short-term risk to residual trees in the thinning units or surrounding areas depending on the timing of thinning, local population of pine engraver beetles, and site and environmental factors such as site quality and precipitation. Our office recommends that slash be generated between late summer and the end of December, if possible, in order to lessen the buildup of ips bark beetles. Slash piles should be placed in stand openings as much as possible and the largest diameter slash put on the outside of the pile to promote quick drying. Tepee style slash piles are useful, with branches and small-diameter slash in the middle and the larger diameter material on the outside. .

Aspen is a shade intolerant species that will benefit greatly from the removal of the ponderosa pine component. Although sprouting will initially be light, the residual trees will sprout due to soil disturbance and enhanced sunlight created during treatment. Theses new sprouts will be protected from elk browse with sturdy fencing that is greater than 6 and ½ feet in height. Fence funding was obtained by the District through a Wildlife Conservation Council grant. Overtime, sprouting from lateral roots will allow the expansion and development of aspen within the fenced areas.

If you have any questions, please give me a call at (928) 556-2075.

/s/ Mary Lou Fairweather
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cc: Shawn A Martin
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John Anhold
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[i] Hawksworth, F.G. 1977. The 6-class dwarf mistletoe rating system. USDA Forest Service, General Technical Report RM-48. 7pp.

[ii] Hawksworth F.G.; Williams-Cipriani J.C.; Eav B.B.; Geils B.W.; Johnson R.R.; Marsden M.A.; Beatty J.S.; Shubert G.D. 1992. Interim dwarf mistletoe impact modeling system: users guide and reference manual. Report MAG-91-3. Fort Collins, CO: USDA Forest Service, Forest Pest Management. 90 p.

[iii] Kenaley S.C., Mathiasen R.L.; Daugherty C.M. 2006. Selection of dwarf mistletoe-infected ponderosa pines by Ips species (Coleoptera: Scolytidae) in northern Arizona. West N Am Naturalist 66(3): 279-284.

[iv] Fairweather M.L, Geils B.W., Manthei M. 2009. Aspen Decline on the Coconino National Forest. In press.

[v] Martin T.E. 2007. Climate correlates of 20 years of trophic changes in a high elevation riparian system. Ecology 88: 367-380.

[vi] Shepperd W.D., Fairweather M.L. 1994. Impact of large ungulates in restoration of aspen communities in a southwestern ponderosa pine ecosystem. In: Covington W.S.; DeBano L.F. eds. Sustainable ecological approach to

land management. Gen. Tech. Rep. RM-247. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station: 344–347.